

CLAIMS

We claim:

1. A machine for supporting a tool, comprising:

a base;

a plurality of support members that are moveable relative to the base, at least one of the support members being adapted to support the tool, the support members cooperating to provide movement of the tool relative to the base along at least two axes;

a plurality of position indicators associated with at least some of the support members, the position indicators providing position information regarding every position of the tool; and

a controller that communicates with the position indicators and determines every position of the tool relative to a selected reference position.

2. The machine of claim 1, wherein the position indicators include at least one linear transducer.

3. The machine of claim 1, wherein the position indicators includes at least one potentiometer.

4. The machine of claim 1, wherein the support members are manually moveable into a plurality of desired tool activation positions and wherein the controller includes a teach mode that allows an operator to manipulate the support members into the desired tool activation positions and the controller stores position information for each of the tool activation positions and the controller controls subsequent use of the tool such that the tool is activated only in the stored activation positions.

5. The machine of claim 4, wherein the controller stores a desired order of activation positions and controls subsequent use of the tool such that the tool is activated only when the tool is moved in the desired order among the activation positions.

6. The machine of claim 1, including a plurality of biasing members that have a selectable biasing force, the biasing members applying a biasing force to at least some of the support members to bias the tool into a selected position.

7. The machine of claim 6, wherein the controller controls the biasing force applied by the biasing members responsive to a determined direction of movement of at least one of the support members to maintain a zero balance condition at all positions of the tool.

8. The machine of claim 6, wherein the controller selectively controls the biasing force applied by at least one of the biasing members responsive to a determined direction of movement of at least one of the support members to decrease the biasing force in a direction that is opposite from the direction of movement.

9. The machine of claim 6, wherein the biasing members each comprise a pneumatic actuator.

10. A machine for supporting a tool, comprising:

a base;

a plurality of support members that are moveable relative to the base, at least one of the support members being adapted to support the tool, the support members cooperating to provide movement of the tool relative to the base along at least two axes;

a plurality of biasing members that have a selectable biasing force, the biasing members applying a biasing force to at least some of the support members; and

a controller that controls the biasing force applied by the biasing members to maintain a desired bias on the support members at a plurality of positions of the tool.

11. The machine of claim 10, wherein the controller controls the biasing force applied by the biasing members responsive to a determined direction of movement of at least one of the support members to decrease the biasing force opposing the direction of movement.

12. The machine of claim 10, wherein the controller controls the biasing members to continuously maintain a zero balance condition for the tool.

13. The machine of claim 10, including a plurality of position indicators associated with at least some of the support members, the position indicators providing position information regarding every position of the tool.

14. The machine of claim 13, wherein the position indicators include at least one of a linear transducer or a potentiometer.

15. The machine of claim 13, wherein the support members are manually moveable into a plurality of desired tool activation positions and wherein the controller includes a teach mode that allows an operator to manipulate the support members into the desired tool activation positions and the controller stores position information for each of the tool activation positions and the controller controls subsequent use of the tool such that the tool is activated only in the stored activation positions.

16. The machine of claim 15, wherein the controller stores a desired order of activation positions and controls subsequent use of the tool such that the tool is activated only when the tool is moved in the desired order among the activation positions.

17. A computer readable medium containing a plurality of computer-executable instructions for controlling the use of a tool supported by a plurality of moveable support members, comprising:

a first set of instructions directing the computer to determine a current position of the tool;

a second set of instructions directing the computer to determine whether the current position is a desired tool activation position; and

a third set of instructions directing the computer to allow activation of the tool only when the tool is in a desired activation position.

18. The storage medium of claim 17, including instructions directing the computer to recognize a teach mode selection, to store a plurality of selected tool activation positions during the teach mode and to subsequently recognize the stored tool activation positions as desired tool activation positions.

19. The storage medium of claim 18, including instructions directing the computer to store a sequence of the selected positions during the teach mode and to subsequently to allow actuation of the tool only when the tool is moved among the desired positions in the stored sequence.

20. The storage medium of claim 17, including instructions directing the computer to control a bias applied to the moveable support members in a manner that automatically responds to movement of at least one of the support members in a direction by decreasing the bias applied in a direction opposite to the movement direction.